Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PRE-APPEAL BRIEF REQUEST FOR REVIEW	Docket Number (Optional) 05-769

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)] on _____ Signature _____ Typed or printed name _____	Application Number 10/550,227	Filed 9/20/05
	First Named Inventor Richardson	
	Art Unit 3662	Examiner Harry L. Liu

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).
        Note: No more than five (5) pages may be provided.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest.
   See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed.
   (Form PTO/SB/96)

☒ attorney or agent of record.
   Registration number 32,901

☐ attorney or agent acting under 37 CFR 1.34.

   Registration number if acting under 37 CFR 1.34 _____

/A. Blair Hughes/
_____
                          Signature

A. Blair Hughes
_____
                          Typed or printed name

312-913-2123
_____
                          Telephone number

May 20, 2008
_____
                          Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required.
Submit multiple forms if more than one signature is required, see below*.

☐   *Total of_____ forms are submitted.

In the Application of:	)	
	)	
Peter Graham Richardson	)	Examiner: Harry L. Liu
	)	
Serial No. 10/550,227	)	
	)	Group Art Unit: 3662
Filed: Sept. 20, 2005	)	
	)	Conf. No. 7674
Title: Time Delay BeamFormer and Method of Time	)	
Delay Beamforming	)	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

PRE-APPEAL BRIEF REQUEST FOR REVIEW REMARKS

Pre-appeal brief review is requested for the above application. This paper sets forth Applicant's concise statement of clear errors in the Examiner's final rejection.

I.   BACKGROUND

Claims 1-30 are pending in the application. The application includes independent claims 1, 15, 23 and 25. Claims 1-30 stand rejected for obviousness over Maalouf (US2002/122002) in view of Andrews (USP 6,380,908). The examiner cites the Andrews reference for the first time in the Final Rejection.

II.   TRAVERSE OF THE OBVIOUSNESS REJECTION

Claims 1-30 are rejected for being obvious over Maalouf in view of Andrews. It is the examiner's position that Maalouf discloses all of the features of all claims except for "a processor to generate space-time signals or steering time delay." The examiner relies upon Andrews for supplying the missing Maalouf teaching. The examiner justifies the combination of references on the basis that it would have been obvious to modify Maalouf with the time delay and sampling method of Andrews "in order to function as a beamformer".

Claims 1-30 are non-obvious and patentable. As an initial matter, the examiner's motivation for combining the references is faulty and the obviousness rejection cannot be sustained on this ground alone. Moreover, the examiner's obviousness rejection is based upon a misunderstanding of the invention and the prior art. As a result, all claims are patentable because one of ordinary skill in the art at the time of the invention would understand that the references cited by the examiner would have been combined in a manner that would not result in the claimed invention. Moreover, all claims are non-obvious because the prior art does not disclose every claim feature.

A.   The Examiner's Motivation For Combining References Is Faulty

It is the examiner's position that one of skilled in the art at the time of the invention would have modified Maalouf with the time delay and sampling method of Andrews in order to function as a beamformer. However, Maalouf discloses a beamformer. Therefore, Andrews is irrelevant to whether or not the Maalouf device "functions" as a beamformer. Clearly, the examiner's stated motivation for combining the references is technically flawed and the obviousness rejection must be withdrawn.

B.   There Is No *Prima Facie* Case Of Obviousness

The examiner's rejection is premised upon a misunderstanding of at least one novel and inventive aspects of the present invention.   In particular, all application claims require a "steering time delay". Since Maalouf is incorrectly cited by the examiner for disclosing a "steering time delay" when it does not, there is no *prima facie* case of obviousness and the examiner's obviousness rejection must be withdrawn.

Maalouf discloses a Space-Time Adaptive (STAP) beamformer. From Figure 1[1] of Maalouf, it is apparent that the STAP processing occurs in units 100 with beamforming of the STAP processed signals taking place in summation unit 140. Maalouf, therefore, teaches conventional STAP beamformers that have been known for some time. The examiner is wrong when he states in his paragraph 2 that "Maalouf does not specifically disclose a processor to generate space-time signals" because Maalouf discloses processor 100 that generates space-time signals. The STAP beamformer of Maalouf, however, does not implement any form of time-

---

[1] As an initial matter, the examiner refers to a Figure 1 in paragraph 2 of the examination report, but no Figure 1 is present. It is assumed that this is in reference to Figure 1 of Maalouf.

delay steering. Indeed, contrary to the examiner's position, Maalouf Paragraph 17 does not disclose a steering time delay. Instead Paragraph 17 discloses a steering vector that uses phase shifts (i.e. $e^{-jA}{}_n$) rather than time delays to implement steering.

The examiner's rejection of claims 2, 4, 7 and 20 further demonstrates that the examiner misunderstands Maalouf and/or the invention. The time delays referred to in claims 2, 4, 7 and 20 are clearly understood to mean the steering time delay of claim 1, as no other type of time delay is claimed. Instead of construing the claim 2, 4, 7 and 20 time delays to be steering time delays, the examiner takes the position that the claimed time delays are equivalent to time delays 110 of Maalouf Figure 1. Delays 110 of Maalouf are not steering time delays, they are merely delay elements as present in any STAP system. For at least these reasons, the rejection of all claims 1-30 and the further rejection of claims 2, 4, 7 and 20 are without merit as the examiner has not made out a *prima facie* case of obviousness at least because Maalouf does not disclose the use of "steering time delays" as the examiner maintains.

C.   The Prior Art Combination Would Not Result In The Claimed Invention

The obviousness rejection is further without merit because it perpetuates the examiner's misunderstanding about the scope and content of the prior art. It was known at the time of the invention to implement time delay steering in a radar system employing STAP processing. Up until the present invention, time delay steering was always carried out on the signals <u>before</u> any processing (such as STAP processing) takes place as shown in Figure 1 (prior art) of the current application. That was - until the present invention – the method well understood by one skilled in the art for time delay steering. That time delay steering was always carried out in signals before processing at the time of the invention was also well know in the prior art. For example, M. Zatman et al, "Time Delay Steering Architectures For Space-Time Adaptive Processing", Proc. Of Antenna and Propagation Society Int. Symposium, pp 2426-2429 (1997) discloses time-delay steered architecture, with the steering time delays taking place <u>before</u> the adaptive processing.

Andrews does not disclose a STAP beamformer. Instead Andrews is directed functionally to a conventional time delay beamformer which implements its time delays at a sub-array level by means of applying delays to the ND clocks, and to the digitised data. The use of time delays

3

of Andrews, as opposed to phase shifts, to steer wideband beams is well known in the art. A person of skill in the art at the time of the invention who wished to apply a time delay to the teaching of Maalouf would do it in a conventional manner by applying the time delays to the input signals. Such devices would also be well known to one skilled in the art at the time of the invention. For example, the prior art document, "Adaptive Processing for Airborne Surveillance Radar", by Ward et al.; Signals, Systems and Computers, 1996. 1996 Conference Record of the Thirtieth Asilomar Conference, Volume 1, 3-6 Nov. 1996 Pages 566-571 discloses on page 570, column 1, second paragraph that, "Several techniques can improve suppression of wideband interference. The first approach is time delay steering the *input data* to the transmit beam direction. True time delays are applied to each element ..." [emphasis added]

The Ward article clearly acts as a teaching away from the present invention, because, as set forth in claims 1 and 15, an inventive element of the present invention is that the time delay steering is done not on the input signals, but instead on the space-time processed signals. The present invention discloses, among others, three elements. These are a) a space time processor, b) a time delay steering arrangement and c) the configuration of these being that time delay steering is done after the space time processing. The combination of Maalouf and Andrews does not have all of these elements so the examiner's obviousness rejection again fails on this basis.

The Final Rejection further suggests that it would be obvious to combine the disclosures of Maalouf with that of Andrews. The understanding one of ordinary skill would have about the prior art as discussed above demonstrates that any such combination would not result in the claimed invention in the mind of one of ordinary skill in the art. Instead, the combination would result in the prior art as shown in Ward et al.

D.   Claims 6, 13, 19 And 22 Are Independently Patentable

The examiner further rejects dependent claims 6 and 19 in view of the Maalouf Paragraph 17 teachings. Claims 6 and 19 cover applying steering vectors to each entry in the co-variance matrix. Maalouf paragraph 17 does not disclose this. Instead, Maalouf Paragraph 17 discloses applying steering vectors to the input samples $X_n(k)$, as shown in equation 2. Also, the steering vectors denoted in Paragraph 17 are based on phase (e $e^{-j\Delta_n}$), and not time, as shown above. For as least this reason, claims 6 and 19 are independently patentable.

4

Regarding claims 13 and 22, the examiner states that Maalouf discloses a beamformer steering time delay. As shown above in relation to claims 1, 8 and 19, Maalouf does not implement a steering time delay. This rejection is therefore must be withdrawn because the examiner has not made out a prima facie case of obviousness of claims 13 and 22.

E.   Independent Claims 23 And 24 Are Independently Patentable

Independent claim 23 stands rejected over Maalouf on the basis that "the beamformer processing is programmed (processor is program based) to apply adaptive weight to the signals of the input channels. An adaptive weight is applied based on (variable) other input channel signal received". However, claim 23 claims a method comprising a set of ordered steps. The examiner's argument above makes no reasoned attack on the ordered steps of this claim. Again, a key aspect of the present invention is that space-time processing is carried out before the time delay steering is carried out. This is claimed in claim 23, and it is not described in the cited prior art. As a result, claim 23 is independently non-obvious and patentable.

Claim 25 stands rejected over Maalouf in view of Andrews on the basis that Maalouf discloses every claim feature except for specifying method for increasing the resolution of a sideways sensing sensor array. The examiner then takes the position that this is inherent in Maalouf. As an initial matter, an obviousness rejection cannot be based upon inherency so claim 25 is patentable because the examiner's rejection is legally flawed. Moreover, the feature is not inherent from Maalouf. Maalouf does not disclose a sideways looking radar, and so there is no concept of the problems inherent in a sideways looking radar. It cannot be concluded, therefore, that Maalouf inherently discloses a method for increasing the resolution of a sideways sensing sensor array.

Claims 3, 5·8-12.14, 16-18, 21, 24 26-30 are dependent directly or indirectly on claim 1, 15, 23 or 25 and are non-obvious for at least the reasons recited above.

Date: May 20, 2008   By: /A. Blair Hughes/
                                        A. Blair Hughes
                                        Reg. No. 32,901
                                        312-913-2123
                                        hughes@mbhb.com